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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/594,307	09/27/2006	Hiroyuki Yamazaki	NE353-PCT(US)	3548

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VIENNA, VA 22182-3817

EXAMINER
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ZHANG, YUANDA

ART UNIT	PAPER NUMBER
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2828

MAIL DATE	DELIVERY MODE
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12/15/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/594,307	<b>Applicant(s)</b> YAMAZAKI, HIROYUKI	
	<b>Examiner</b> YUANDA ZHANG	<b>Art Unit</b> 2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 25 November 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 7-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-5, 7, 10-19, 22 and 25 is/are allowed.
- 6) ☒ Claim(s) 8, 9, 20, 21, 23, 24 and 26 is/are rejected.
- 7) ☒ Claim(s) 27 and 28 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

1. Amended claims 1, 8, 9, 20 & 25, cancelled claim 6 and newly added claims 27 & 28 are acknowledged. Claims 1-5 and 7-28 are currently pending.

### ***Response to Arguments***

2. Applicant's argument regarding the 35 USC 103 rejection of claims 8, 9, 20, 21 & 26 over Ma'865, Chin'421 and Po'117 have been considered and are not persuasive.

3. The Applicant has argued that Ma, both alone and in combination with Chin and Po, fails to disclose "wherein the tuning device changes refractive indexes of the ring-type waveguides of the ring resonators for changing the resonance wavelength" as recited in claim 8. The Examiner respectfully disagrees. Ma explicitly discloses that wavelength tuning is achieved by electrically changing the refractive index of a semiconductor (col. 15 lines 1-11 and also admitted by the Applicant, see remarks, p14, lines 10-16). Therefore, the limitation above recited in claim 8 is clearly taught by Ma. In addition, the Applicant has also argued that electrically adjusting the refractive index of the semiconductor as taught by Ma fails to disclose limitations of "utilizing temperature properties" recited in claims 9, 20, 21 & 26. The Examiner respectfully disagrees. The Examiner notes that it's well known in the art that temperature of an element changes when various amount of voltage or current is applied. Electrically adjusting the refractive index of the semiconductor inherently discloses changing the temperature of the ring resonator by applying various amount of voltage or current. Therefore, limitations of claims 9, 20, 21 & 26 are implicitly taught by Ma.

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4. Applicant's argument regarding the 35 USC 103 rejection of claims 22 & 23 over Ma'865, Chin'421 and Po'117 have been considered and are not persuasive.

5. The Applicant has argued that Ma fails to disclose or suggest film-like heaters which can be formed directly on board. The Examiner respectfully disagrees. Ma clearly discloses electrode contacts 128i, 128ii & 128iii interpreted to be the film-like heaters (col. 14 lines 55-57 and fig. 12A & fig. 12B) because the electrode contacts are heated when voltage or current is applied. Since the Applicant has not explicitly defined the thickness of the heaters, any electrode contact with an appropriate thickness would be considered film-like. Furthermore, the Applicant has also argued that the film-like heaters can be formed directly on the board. First of all, it is noted that the features upon which applicant relies (i.e., directly on the board) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Second, claim 23 only requires "said film-like heaters are formed on said single board." Ma discloses an electrode contact 128 formed on top of an optical resonator 122 which is formed on a substrate 121; therefore, the electrode contact 128 is also formed on the substrate 121. As a result, the limitations of claims 22 & 23 are taught by Ma.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 8, 9, 20, 21, 23, 24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ma (US Patent 6,891,865 B1) in view of Chin et al (US Patent 6,643,421 B1) and Po (US Patent 4,852,117).

9. In re claim 8, with reference to figure 12B, Ma discloses a tunable laser (101b), comprising: a multiple ring resonator in which a plurality of ring resonators (multiple resonator 122i – 122iii, col. 14 lines 47-50); an LD-side waveguide (waveguide 124, col. 11 lines 66-67) having a first end connected to one of the plurality of ring resonators through evanescent coupling (col. 11 lines 18-26); a reflection-side waveguide (126, col. 11 lines 66-67) having a first end connected to other one of the plurality of ring resonators through evanescent coupling (col. 11 lines 18-26); a single board (121, col. 3 lines 38-41 & also see figure 20A) on which the ring resonator, the LD-side waveguide (124) and the reflection-side waveguide (126) are formed; a reflection film (high reflection coating 154, col. 13 lines 6-10) provided to a second end of the reflection-side waveguide, wherein said reflection film comprises a high-reflection film capable of reflecting laser light without regard to a wavelength of a transmission peak of said laser

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light; a laser diode chip (110, col. 11 lines 49-54) having a low reflection film (AR coating 119, col. 11 lines 57-59) formed on one of two opposing emission end faces, which is optically coupled to the LD-side waveguide through the low reflection film (col. 12 lines 7-12); a tuning device (electrodes 128i-128iii, col. 14 lines 55-57) for changing a resonance wavelength of only the multiple ring resonator (col. 3 lines 16-19), wherein the tuning device changes refractive indexes of the ring-type waveguides of the ring resonators for changing the resonance wavelength (col. 15 lines 1-11).

10. Ma does not disclose the plurality of ring-type waveguides having optical path lengths different from each other. However, with reference to figure 2, Chin et al disclose a plurality of ring type waveguides (14A-14D) having optical path lengths different from each other (col. 2 lines 25-30). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the plurality of ring-type waveguides of Ma with the plurality of ring-type waveguides having different optical path lengths as taught by Chin et al in order to obtain a wider range of tunable wavelengths.

11. Ma does not disclose the plurality of ring-type waveguides are coupled through an optical coupling device. With reference to figure 10, Po discloses a multiple ring resonator in which a plurality of ring resonators (pump loop 18" and additional loop 136), which are constituted with ring-type waveguides having optical path lengths different from each other ("the additional cavity is of slightly different length"), are coupled through an optical-coupling device (lateral coupling 141 & 142) (col. 13 lines 50-64). It would have been obvious to one having ordinary skill in the art at the time the

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invention was made to couple the plurality of ring-type waveguides with an optical coupling device since it was known in the art that an optical coupler as taught by Po is commonly use to couple between two micro-ring resonators.

12. In re claims 9, 20, 21 & 26, Ma discloses wherein the tuning device changes refractive indexes of the ring-type waveguides of the ring resonators for changing the resonance wavelength (col. 3 lines 16-19, col. 15 lines 1-11 & see arguments above).

13. In re claims 23 & 24, Ma discloses wherein film-like heaters (electrodes 128i – 128iii) are provided as the tuning device (col. 14 lines 55-57 & see arguments above).

***Allowable Subject Matter***

14. Claims 27 and 28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

15. Claims 1-5, 7, 10-19, 22 and 25 are allowed.

16. The following is an examiner's statement of reasons for allowance: claim 1 is believed to be allowable because it has been converted to independent form including all of the limitations of the base claim and any intervening claims (reasons for allowance can be found on paragraph 26, Office action dated 8/27/09). Claims 2-5, 7, 10-19, 22 and 25 are also allowable as they directly or indirectly depend on claim 1.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably

accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Conclusion***

17. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YUANDA ZHANG whose telephone number is (571)270-1439. The examiner can normally be reached on Monday-Friday, 9:00am-5:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Yuanda Zhang/  
Examiner, Art Unit 2828  
12/09/09

/Minsun Harvey/  
Supervisory Patent Examiner, Art Unit 2828